

1 **ABSTRACT**

2 Improved methods and apparatuses are provided to address a potential
3 “hidden beam problem” in wireless communication systems employing smart
4 antennas. The improved methods and apparatuses utilize complementary
5 beamforming (CBF) techniques, such as, for example, Subspace Complementary
6 Beamforming (SCBF), Complementary Superposition Beamforming (CSBF)
7 and/or Single Beam Complementary Beamforming (SBCBF) techniques.

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